500221

FLOOD INSURANCE STUDY

NEWARK PUBLIC LIBRARY
JAN 14 1981
U.S. GOVT. PUBS.
DEPOSITORY 376

TOWN OF ALBURG, VERMONT
GRAND ISLE COUNTY

best copy available

SEPTEMBER 16, 1980

FEDERAL EMERGENCY MANAGEMENT AGENCY
FEDERAL INSURANCE ADMINISTRATION
COMMUNITY NUMBER - 500221

FEM 1.209

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 Purpose of Study	1
	1.2 Coordination	1
	1.3 Authority and Acknowledgements	2
2.0	AREA STUDIED	2
	2.1 Scope of Study	2
	2.2 Community Description	2
	2.3 Principal Flood Problems	4
	2.4 Flood Protection Measures	5
3.0	ENGINEERING METHODS	5
	3.1 Hydrologic and Hydraulic Analyses	5
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	6
	4.1 Flood Boundaries	6
5.0	INSURANCE APPLICATION	6
	5.1 Reach Determinations	7
	5.2 Flood Hazard Factors	7
	5.3 Flood Insurance Zones	7
	5.4 Flood Insurance Rate Map Description	8

TABLE OF CONTENTS - continued

	Page
6.0 OTHER STUDIES	8
7.0 LOCATION OF DATA	10
8.0 BIBLIOGRAPHY AND REFERENCES	10

FIGURES

Figure 1 - Vicinity Map	3

TABLES

Table 1 - Summary of Elevations	5
Table 2 - Flood Insurance Zone Data	9

EXHIBITS

Exhibit 1 - Flood Insurance Rate Map Index

Exhibit 2 - Flood Insurance Rate Map

FLOOD INSURANCE STUDY
TOWN OF ALBURG, VERMONT

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the Town of Alburg, Grand Isle County, Vermont, and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert Alburg to the regular program of flood insurance by the Federal Insurance Administration (FIA). Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

An initial meeting on April 12, 1978, between representatives of the FIA, Dufresne-Henry (the study contractor), and the town was held to determine the areas to be studied by detailed and approximate methods. The Vermont Department of Water Resources and the Franklin County Regional Planning Commission were notified of the study and requested to provide any pertinent information. The U. S. Department of the Interior, Fish and Wildlife Service, was contacted to obtain available topographic mapping of the detailed-study area. The community provided data concerning flood hazards, flooding experience, plans to avoid potential flood hazards, and any other data deemed appropriate. Periodic contacts were made with local community officials to keep them informed of the progress of the study and to solicit pertinent information. The State of Vermont forwarded information concerning flood elevations on Lake Champlain.

The FIA conducted a meeting on November 10, 1976, on Lake Champlain study methods, in Montpelier, Vermont. An intermediate coordination meeting between officials of the Town of Alburg and the study contractor was held on April 26, 1979.

A final meeting attended by representatives of the FIA, the community, and the study contractor was held on July 10, 1979, to resolve any problems or conflicts with the results of this study and to provide an opportunity for local community officials to become familiar with the planning material provided.

1.3 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were prepared by Dufresne-Henry Engineering Corporation for the Federal Insurance Administration, under Contract No. H-4751. This work, which was completed in March 1979, covered all significant flooding sources in the Town of Alburg, Vermont.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Alburg, Grand Isle County, Vermont. Not included in the study is the Village of Alburg, which lies wholly within the town limits. The area of study is shown on the Vicinity Map (Figure 1).

A detailed study was performed for that portion of Lake Champlain lying within the boundaries of the Town of Alburg. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction for the next five years, through March 1984.

2.2 Community Description

The Town of Alburg is located in northern Grand Isle County in northwestern Vermont. The Village of Alburg is located in the northwestern section of the town. The town lies on land that extends in a peninsula into Lake Champlain; it is bounded on the west by Lake Champlain and Clinton County, New York; on the north by Missisquoi County, Quebec; on the east by Lake Champlain and the Town of Swanton, Vermont; and on the south by the Town of North Hero, Vermont, which is an island. The 1975 population estimate of 1,323 represents a four percent increase over the 1970 population (Reference 1). Fifty-five percent of the Alburg population lives in the Village of Alburg, with the remaining 45 percent residing in the town proper.

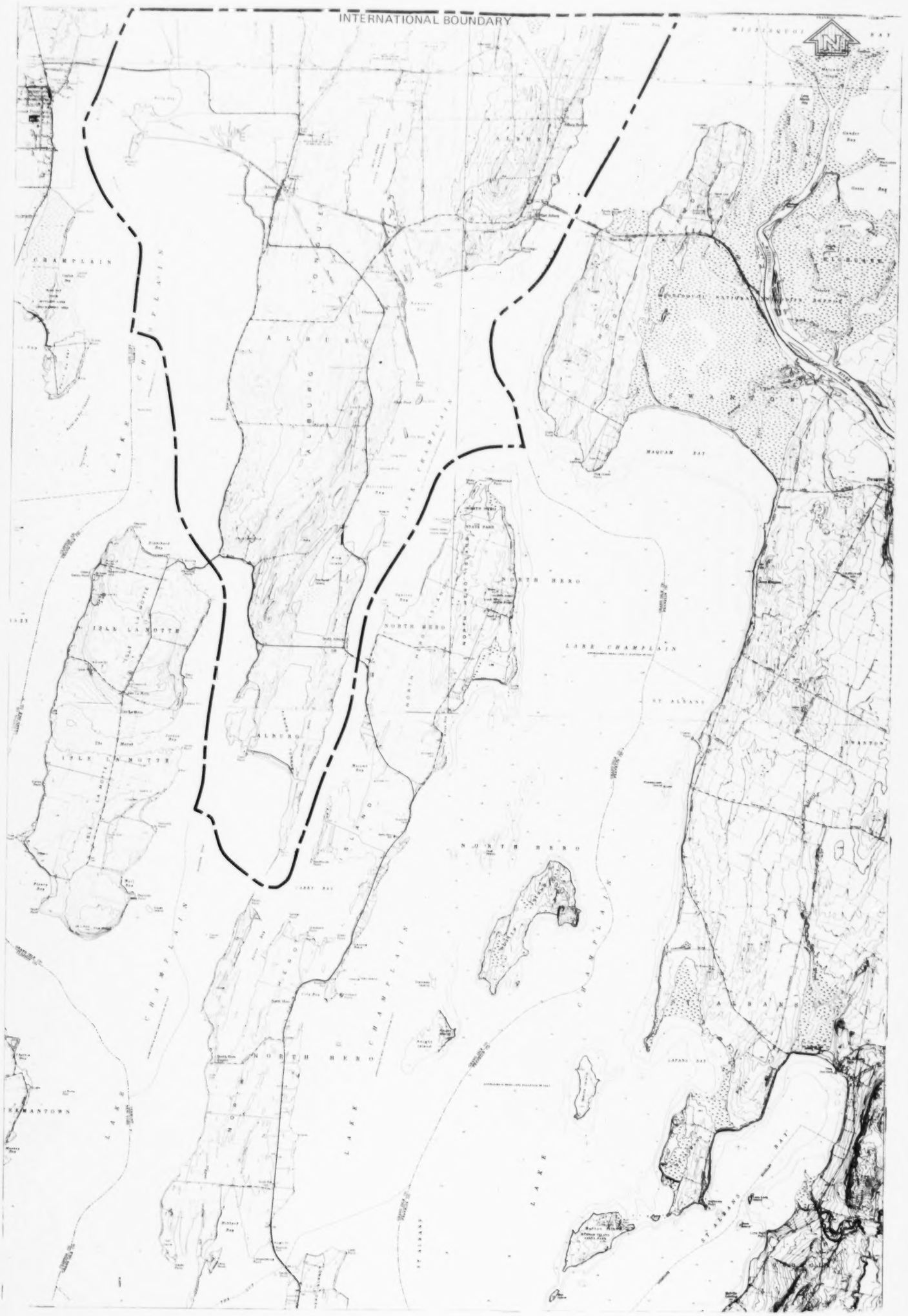

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ALBURG, VT
(GRAND ISLE CO.)

APPROXIMATE SCALE
500 0 6,500 13,000 19,500 FEET

VICINITY MAP

The climate of this region is influenced by Lake Champlain and the adjacent barrier ranges, the Green Mountains, and the Adirondacks. Lake Champlain has a significant moderating effect on the climate, extending the growing season to 160 days. The weather patterns in the region are affected by the Green Mountains and the Adirondacks, along with some influence from the Taconic Mountains to the south. The valley is protected from most northeasters and tropical storms. The prevailing surface winds are generally from the south with frequent shifts to the north during the winter. Winter snows are relatively light for Vermont, averaging 60 to 70 inches annually. The average annual precipitation is 33 inches. The average annual temperature is 46.3 degrees Fahrenheit (°F) (Reference 2).

Topography within the town is fairly uniform. Gently rolling hills achieve a maximum elevation of 180 feet. The region is underlain by shale, slate, and limestone of the Ordovician age. The soils in Alburg are primarily derived from silt and clay deposited in post-glacial Lake Vermont (Reference 3).

The Town of Alburg has two significant streams, Sucker Brook and Mud Creek. It also has intermittent streams and drainage canals that flow into Lake Champlain, which is the sixth largest body of fresh water in the United States. The lake has a surface area of 490 square miles and is over 100 miles long, measured from the northern end at Rouses Point, New York, to the southern end near Lock 12C of the New York State barge canal system.

Grand Isle County has some of the best agricultural land in the State of Vermont, and agriculture is the most important enterprise in the Town of Alburg. A large portion of the cropland is used to grow corn and hay in support of dairy farming, and there are several apple orchards close to Lake Champlain (Reference 3).

2.3 Principal Flood Problems

Flood damage in the Town of Alburg has been caused primarily by high levels on Lake Champlain and the consequent erosion of the bank along the shore. Extremely high lake stages recorded in April and May of 1971, 1972, and 1976 resulted in flooding of some lake shore properties within the Village of Alburg. The 1976 flood had an estimated 25-year return period. The rise in lake level is often associated with sudden snowmelt which results in an enormous volume of water released from the mountainous and large (8,277-square mile) drainage area of Lake Champlain.

There are no reported instances of flooding of houses along the other creeks and brooks in the Town of Alburg.

2.4 Flood Protection Measures

There were no flood control structures existing or authorized in the Town of Alburg at the time of this study.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10, 50, 100, and 500 years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the watershed of the flooding source.

3.1 Hydrologic and Hydraulic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for the flooding source studied in detail in the community.

Analyses of the levels on Lake Champlain at the Town of Alburg were adopted from the City of Plattsburgh Flood Insurance Study and from a publication entitled Technical Report, In Regulation of Lake Champlain and the Upper Richelieu River, prepared by the International Champlain Richelieu Board (References 4 and 5). Data used in this study were obtained from gaging stations at Rouses Point, New York, and Burlington, Vermont (Reference 4). A summary of elevation-frequency relationships for Lake Champlain is shown in Table 1, "Summary of Elevations."

TABLE 1 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
LAKE CHAMPLAIN				
Coastline	101.2	101.9	102.0	102.3

The ultimate water level on Lake Champlain can be raised by adding the dynamic effect of wind-generated waves and runup. However, for purposes of providing information necessary to permit the assessment

of flood hazards and flood plain management, the FIA approves the use of the water levels determined by hydrologic methods (not those caused by wave runup).

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. The 100- and 500-year boundaries were delineated using topographic maps enlarged to a scale of 1:9,600, with a contour interval of 10 feet (Reference 6). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

Flood boundaries are indicated on the Flood Insurance Rate Map. On this map, the 100-year flood boundary corresponds to the boundary of the areas of special flood hazards (Zone A2), and the 500-year flood boundary corresponds to the boundary of areas of moderate flood hazards (Zone B).

Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and lack of detailed topographic data, such areas are not shown.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood

insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for the flooding source affecting the Town of Alburg.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses or waterbodies having relatively the same flood hazard. In lacustrine areas, reaches are limited to the distance for which the 100-year flood elevation does not vary more than 1.0 foot. Using these criteria, the entire shoreline qualifies as one reach whose flooding source is Lake Champlain. The location of this reach is shown on the Flood Insurance Rate Map.

5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Town of Alburg was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A2:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHF.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain

that are protected from the 100-year flood by dike, levee, or other water control structure; also, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

Table 2, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding source studied in detail in the town.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Alburg is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

The analyses of flood elevations for this study were adopted from the Flood Insurance Study for the City of Plattsburgh, New York, and from a technical report prepared by the International Champlain Richelieu Board with the approval of the FIA (References 4 and 5).

Flood Insurance Studies are underway for the Towns of Swanton and North Hero, which are Alburg's neighbors to the east and south, respectively (References 7 and 8). A Flood Insurance Study for the Village of Alburg, which lies within the town, has been prepared concurrent with the present study (Reference 9). Data used in all these studies have been coordinated to assure agreement of results across municipal boundaries.

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Lake Champlain Reach 1	05,10,15,25	-0.8	-0.1	+0.3	010	A2	102

[1]Flood Insurance Rate Map Panel
[2]Weighted average
[3]Rounded to the nearest foot - see map

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF ALBURG, VT
(GRAND ISLE CO.)

FLOOD INSURANCE ZONE DATA

LAKE CHAMPLAIN

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Insurance and Mitigation Division of the Federal Emergency Management Agency, Regional Director, Region I Office, 15 New Chardon Street, Boston, Massachusetts 02114.

8.0 BIBLIOGRAPHY AND REFERENCES

1. The Sunday Rutland Herald and Sunday Times Argus, Rutland, Vermont, Page 7, May 22, 1977.

2. State of Vermont, Land Planning Office, Vermont Land Capability, Montpelier, Vermont, September 1974.

3. U. S. Department of Agriculture, Soil Conservation Service, Soil Survey, Grand Isle County, Vermont, Washington, D. C., December 1959.

4. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Plattsburgh, Clinton County, New York, Washington, D. C., April 1978.

5. International Champlain Richelieu Board, Technical Report, In Regulation of Lake Champlain and the Upper Richelieu River, Montpelier, Vermont, December 1977.

6. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 Feet: East Alburg, Vermont, 1964; Rouses Point, New York-Vermont, 1966.

7. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Swanton, Franklin County, Vermont (Unpublished).

8. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of North Hero, Grand Isle County, Vermont (Unpublished).

9. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Village of Alburg, Grand Isle County, Vermont (Unpublished).

Brater, Ernest F. and Horace W. King, Handbook of Hydraulics, Fifth Edition, New York, McGraw-Hill, 1963.

Chow, Ven Te, ed., Handbook of Applied Hydrology, New York, McGraw-Hill, 1964.

Linsley, Ray K., Max A. Kohler, and Joseph L. Paulhus, Hydrology for Engineers, Second Edition, New York, McGraw-Hill, 1975.

State of Vermont, Agency of Environmental Conservation, Department of Water Resources, Lake Champlain Water Levels, Observations at Rouses Point, New York, 1869-Present, Montpelier, Vermont, August 1977.

U. S. Army Corps of Engineers, Coastal Engineering Research Center, Shore Protection Manual, Second Edition, Ft. Belvoir, Virginia, 1975.

U. S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Survey, Lake Survey Center, Navigational Chart No. 171, Scale 1:40,000, Soundings in Feet, Lake Champlain, Rouses Point to Cumberland Head and Savage Island.

U. S. Department of the Interior, Fish and Wildlife Service, Photogrammetric Map, Scale 1:2,500, Contour Interval 0.5 Meters: Lake Champlain, Kelly Bay, Dillenbeck and Palmers, Grand Isle, Vermont, 1976.